



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,749	03/04/2004	Yoshiaki Fukuzumi	249968US2	5254
22850	7590	11/15/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			PHAM, LONG	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 11/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

10/791,749

Applicant(s)

FUKUZUMI ET AL.

Examiner

Long Pham

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 8-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 1-7 in the reply filed on 08/26/05 is acknowledged.

Drawings

Figures 22-25 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3, 4, 5, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art (AAPA) of this application in combination with Kubo (US patent 5,567,629), Park et al. (US publication 2003/0032295), and McDavid (US patent 4,736,233).

With respect to claims 1 and 5, AAPA teaches a semiconductor comprising (see figs 22-25 and associated text of this application):

A support substrate 1;

An embedded insulating layer 3 formed on the support substrate;

A semiconductor layer 4 on the embedded insulating layer;

At least an element region in the semiconductor layer;

A plurality of source/drain regions 6D,6S of a first conductivity type (P), formed in the element region at predetermined intervals;

A plurality of body regions 4b of a second conductivity type (N), sandwiched between a pair of adjacent ones of the source/drain regions in the element region; and

A gate 7 formed on each of the body region with a gate insulating film 6 being laid between them,

Each of the source/drain regions including:

An inner high-concentration portion extending to the embedded insulating layer.

AAPA teaches the source/drain region comprises an inner high-concentration portion extending to the embedded insulating layer but fails to teach that the source/drain region further comprises an outer low-concentration portion surrounding the inner high-concentration portion and more shallow than the inner portion.

Kubo teaches source/drain region having an inner deep high-concentration portion and an outer shallow low-concentration portion surrounding the inner deep high-concentration portion. See fig. 19 and associated text of Kubo.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the source/drain structure of Kubo into the device of AAPA to achieve high power gains and high-frequency high-output. See col. 2, lines 5-10.

With respect to claim 2, AAPA and Kubo fail to teach that the inner high-concentration portion of the source/drain region is doped with arsenic and the outer low-concentration portion of the source/drain region is doped with phosphorus.

McDavid teaches doping source/drain with arsenic to obtain high concentration portion and doping source/drain with phosphorus to obtain low concentration portion. See col. 2, lines 25-40.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the teaching of McDavid into the device of AAPA and Kubo to minimize the impact to ionization. See col. 2, lines 25-40.

With respect to claim 3, AAPA and Kubu fail to teach doping the high-concentration portion of the source/drain with ge or IV elements.

Park et al. teach implanting ge into the source/drain to provide amorphous state to improve controllability of etching. See abstract, [0011], and [0047].

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the teaching of Park et al. into the device of AAPA, Kubo, and McDavid to obtain the above benefit.

With respect to claim 4, Since AAPA, Kubo, McDavid, and Park et al. teach the claimed device, the taught device would inherently be capable of being configured to be able to store a charge developed when a current flows between two source/drain regions both sides of the body region.

With respect to claim 6, AAPA further teaches on each of the source/drain regions, a conductive layer 9D is formed. See fig. 23 of this application.

With respect to claim 7, AAPA further teaches that both sides of each of the gates are adjacent to the conductive layers but fails to teach forming a sidewall spacer comprising of oxide and nitride on the gate.

However, the formation of sidewall spacer comprising of oxide and nitride on gate is well-known.

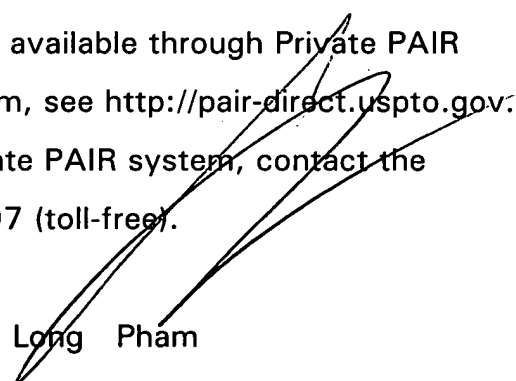
Conclusion

Art Unit: 2814

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on Mon-Frid, 10am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Long Pham
Primary Examiner
Art Unit 2814

LP